



ZK-SAM, ZK-SAMp, ZK-MPS User Manual

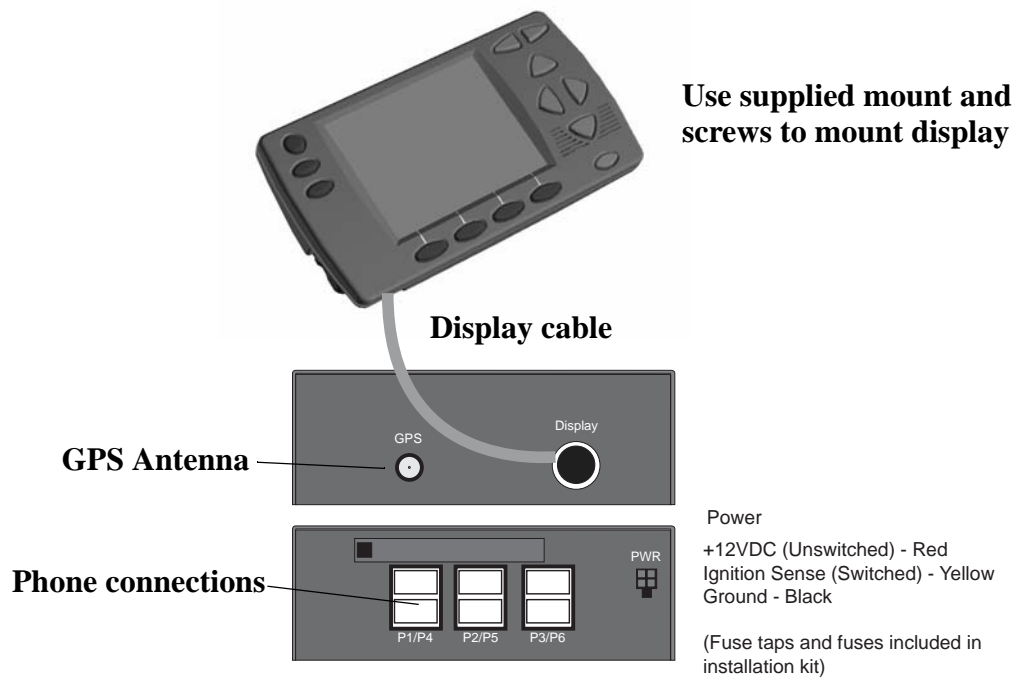
ZK Celltest, Inc.
256 Gibraltar Drive
Suite 109
Sunnyvale, CA 94089
(Tel) 408.752.0449 (Fax) 408.752.0477
Web: www.zk.com
e-mail: support@zk.com
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Installation



Installation: Your unit came with the fused vehicle power assembly.

- Step 1 - Crimp one of the mini-fused leads to the Red (Constant Power) wire of the Unit Power Assembly cable.
- Step 2 - Crimp the other mini-fused lead to the Yellow (Ignition Sensor) wire of the Unit Power Assembly cable.
- Step 3 - Crimp the ring lug to the Black (Ground) wire of the Unit Power Assembly cable.
- Step 4 - Referring to your vehicle owner's manual locate a fuse position with constant power for the Unit Power Assembly Red Wire.
- Step 5 - Remove the existing fuse from the vehicle fuse position you selected in Step 4 and insert it into the available fuse position in the mini-fused lead.
- Step 6 - Insert the mini-fused lead into the vehicle fuse position you selected in Step 4.
- Step 7 - Referring to your vehicle owner's manual locate a fuse position with ignition sensor for the Unit Power Assembly Yellow Wire.
- Step 8 - Remove the existing fuse from the vehicle fuse position you selected in Step 7 and insert it into the available fuse position in the mini-fused lead.

Step 9 - Insert the mini-fused lead into the vehicle fuse position you selected in Step 7.

Step 10 - Attach the Black lead of the Unit Power Assembly to a ground surface of the vehicle.

Configurations

Features Table

Below is a table of the Features and Options available on each of the three data collection products, ZK-SAM, ZK-SAMp and ZK-MPS.

		ZK-SAM	ZK-SAMp	ZK-MPS
Simultaneous phones	Port 1	Y	Y	Y
	Port 2	Y	Y	Y
	Port 3	Y	Y	Y
	Port 4	Y	Y	Y
	Port 5	Y	Y	Y
Technologies	EAMPS Voice	Y	Y	Y
	CDMA Voice	Y	Y	Y
	GSM Voice	Y	Y	Y
	iDEN	Y	Y	Y
	UMTS Voice/Data	Y	Y	Y
	CDMA 2000 Data	Y	Y	Y
	EvDO Rev O	Y	Y	Y
	EVDO RevA	Y	Y	Y
	GPRS / EDGE	Y	Y	Y
	HSDPA	Y	Y	Y
	SMS	Y	Y	Y
Phone scanners	GSM/BSIC	Y	Y	Y
	PN 850MHz	Y	Y	Y
	PN 1900MHz	Y	Y	Y
Integrated Scanner	IS-95 PN	N	N	Y
	GSM/BSIC	N	N	Y
	EvDO PN	N	N	Y
	UMTS Scrambling Code	N	N	Y
	Portable	N	Y	Y
	GPS	Y	Y	Y

Compatible Phones

Go to http://www.zk.com/support/release_info.html for an updated list of compatible phones.

Quick Start

NOTE: The Compact Flash memory card must be properly inserted into its slot for the unit to function properly. It is important to be aware that the CF card must be inserted with the top side facing the SAM cover. When removing the Compact Flash card you must **FIRST** turn the unit off, otherwise you risk losing data and corrupting the compact flash card file system.

Voice Call Testing

To get up and running right away do the following:

- Step 1. Securely install the Compact Flash memory card in the unit.
- Step 2. After installation, turn on the phones, and turn on power.
- Step 3. In the Phone Setup Screen select the correct phones for the phone connections.
- Step 4. In the Main Menu highlight SAM-ALL and press ENTER
- Step 5. Use the arrow keys to change screens.

Data Call Testing

To get up and running right away do the following:

- Step 1. Securely install the Compact Flash memory card in the unit
- Step 2. After installation, turn on the phones, turn on power.
- Step 3. In the Phone Setup Screen configure for the CDMA or GSM phone and connect the data-capable phone to the unit.
- Step 4. Configure the Link. See “Link Setup . . .” on page 43.
- Step 5. In the Main Menu highlight SAM-ALL and press ENTER.
- Step 6. Use the left/right arrow keys to change screens and go to the “Data Test” Screen.

ZK-SAM

The vehicular only ZK-SAM can be configured with a choice of air interface technologies, phone-based scanners and up to three phone connections.

The ZK-SAM is typically used by Cellular Technicians to monitor and troubleshoot network and cell site related problems.

ZK-SAMp

The vehicular/portable ZK-SAMp can be configured with a choice of air interface technologies, phone-based scanners, and up to five phone connections.

The SAMp includes two batteries and a carrying case allowing indoor walk-around measurements.

The ZK-SAMp is used for indoor/outdoor measurement applications and for benchmarking.

ZK-MPS

The ZK-MPS can be configured with a choice of air interface technologies, phone-based scanners, internal high performance multi-technology scanners and up to five phone connections.

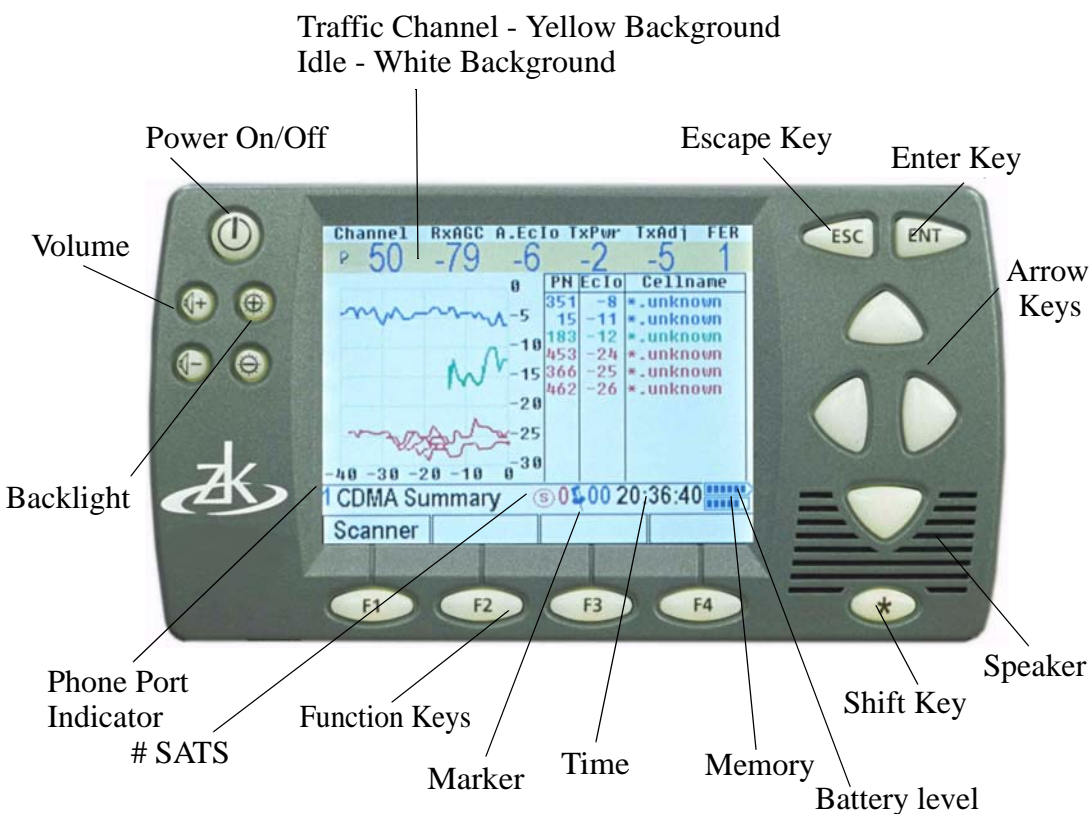
The ZK-MPS is typically used by System Performance and RF Engineers to optimize cellular networks.

ZK-MDS

The ZK-MDS include two high performance multi-technology scanners that are capable of simultaneously monitoring 6 RF bands: 850 MHz, 900 MHz, 1800 MHz, 1900 MHz, and 2100 MHz, and 1700/2100 MHz (AWS). The ZK-MDS can be configured with a choice of air interface technologies and up to five phone connections. Additionally, the ZK-MDS can include a battery and carrying pouch to allow for in-building monitoring of RF conditions.

The ZK-MDS is typically used by System Performance and RF Engineers to who work in an environment where testing multi-band technologies is critical.

Operation & Screens



Status Elements

The status elements provide general information about the operation and the functionality of the screens.

Compact Flash Memory Card

A compact flash memory card is used to store log data. The units typically arrive with a high quality card and if needed, you can replace this card with most commercial grade versions. It is recommended that you format any CF card from the Utilities option at the Main menu.

IMPORTANT: DO NOT REMOVE THE CARD WHEN THE UNIT IS POWERED ON. ONLY REMOVE THE CARD AFTER YOU HAVE TURNED THE UNIT OFF. CARDS LESS THAN 128MB ARE NOT SUPPORTED. THE MAXIMUM SIZE CARD THAT WE HAVE TESTSED IS 1GB.

VERIFY THAT THE CARD IS INERTED WITH THE PROPER ORIENTATION -- THE LABEL ON THE CARD SHOULD FACE UP, TOWARD THE TOP COVER OF THE UNIT.

ONLY CF CARDS WITH FAT-16 FORMATTING ARE SUPPORTED.

Phone 1, 2, 3, 4 and 5 Indicators

There is an indicator on some screens that allows the user to switch between phones. When the indicator is displayed in the lower left corner of the display the user can press the up/down arrow keys to switch between phone displays.

Removable Battery

The ZK-SAMp with the portability option comes with a removable battery. A fully charged battery will provide approximately four to five hours of usage with the backlight turned off. Before removing the battery, make sure that external power is disconnected and the unit is turned off. Loosen the thumb screw to the battery compartment and remove the battery door. Pull the battery cord to remove the battery.

For the ZK-MDS, the external battery connector plugs directly into the main power of the unit. The external battery fits into the carrying pouch supplied with the unit and includes a meter to alert the user to the amount of reserve capacity left in the battery cells. It is important to monitor the amount of battery life left in reserve during testing and to change batteries when the reserve capacity reaches 10%.



Battery compartment

Battery Level Indicator

NOTE: Valid for portable ZK-SAMp. A battery icon is used to indicate the current storage level of the main battery. The unit will power down when the battery has only five-percent charge remaining.

When the battery level drops below a safe operating capacity, the unit will give warning to the operator with both a message and an audio announcement. Replace the battery with a fully charged one.

Performance Tip: A fully charged battery (two hours of charging time) typically provides four to five hours of operation. To increase the battery life, set the backlight to its lowest setting.

Memory Indicator

An icon is used to indicate the amount of free memory on the Compact Flash card for data. When memory is full the data will be overwritten on a first in - first out (FIFO) basis.

The amount of data stored is dependent on the disk space of the compact flash card. Typically, up to 5MB of data per CDMA phone and up to 7MB per GSM phone can be stored per hour.

Markers

Pressing the ENTER key inserts a marker into the data file for post-processing. When a marker is entered, the "Pushpin" icon will be displayed with the number of the marker next to it.

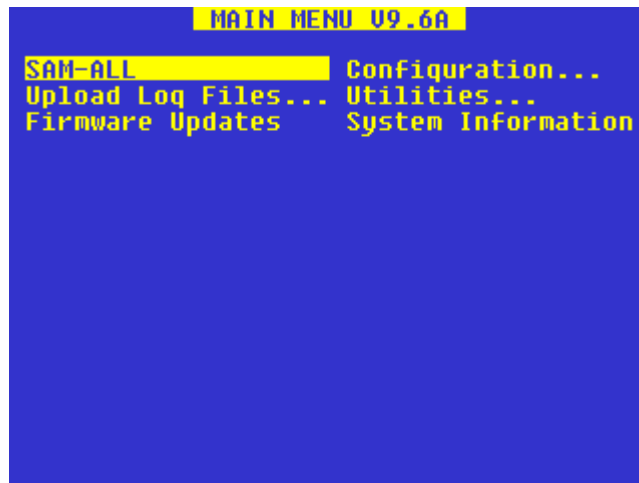
Time with GPS Available

The Time indicator appears on every screen. Units with GPS will display a circle and, in the lower portion of the screen, the number of locked-in satellites.

The time is generated by an internal clock backed up by an internal lithium battery. The average lifespan of the internal battery is ten years and must be replaced by a factory-authorized technician.

For units with GPS receivers the internal clock is updated by GPS time (if there is a current fix) each time the user goes into and out of the SAM-ALL.

Main Menu



The Main Menu is displayed after the unit is powered on and goes through its start up procedure. The main menu contains the following functions:

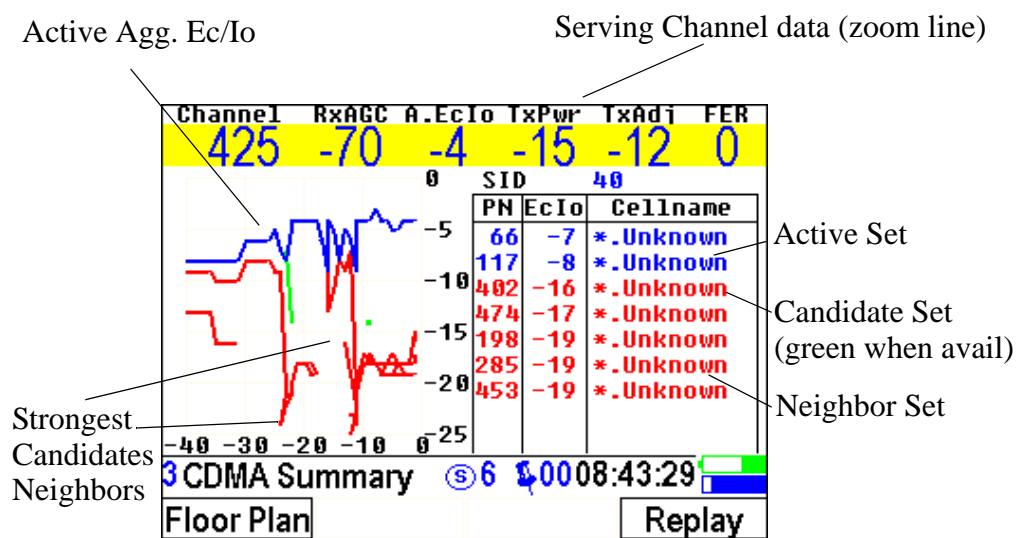
TABLE 1:

Menu Item	Description
SAM-ALL	Live call follow, coverage and interference measuring
Upload Log File	Remote Data Link -- send log files to a central data collection server
Firmware Updates	Information screen about software upgrade availability
Configuration	A list of menus to customize the configuration
Utilities	Screen for reformatting the Compact Flash card. Additional utilities may be added in the future.
System Information	Provides software and hardware version information and available free memory

SAM-ALL Screens

The SAM-ALL data screens will appear when SAM-ALL is highlighted in the Main Menu and the ENTER key is depressed.

CDMA Summary



The Zoom Summary data screen is the one most commonly used because it summarizes all the phone data collected.

Screen Elements

Zoom Line: Paging channels are shown as inverse video (light text on a dark background). Traffic channels are shown as normal video (dark text on a light background). The following values for the active channel appear in the zoom line from left to right:

Hyperband Indicator: A lower case “p” indicates that the phone is on a PCS channel; a lower case “c” indicates that the phone is on a cellular channel; a lower case “g” indicates that the phone is on a GSM 900 channel; a lower case “d” indicates that the phone is on a DCS 1800 channel.

Frequency Channel: Indicates the center frequency channel for the CDMA channel

RxAGC (RSSI): The signal strength of the frequency channel in dBm.

Agg EcIo: Represents the aggregate Ec/Io of the Active Set in dB.

Tx Power: Transmit power of the phone in units of dBm. (Displayed only when a call is in progress.)

Tx Gain Adjust: Transmit gain adjust of the phone in units of dB. (Displayed only when a call is in progress.)

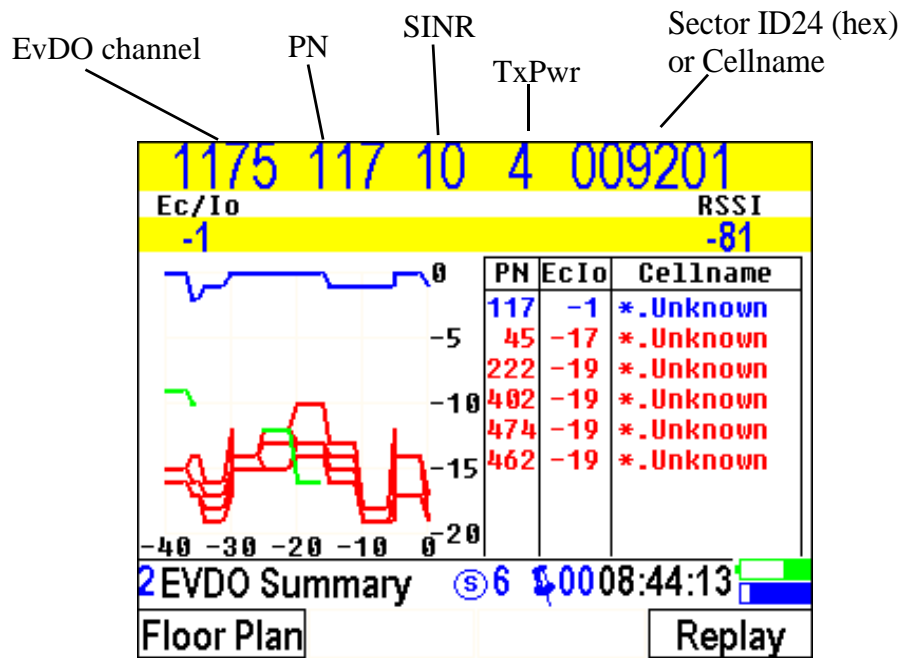
FER: Frame error rate of the downlink in percentages. FER is calculated every 100 frames (2 seconds) by taking the number of bad frames and dividing by 100. (Displayed only when a call is in progress.)

Table: The table shows the Active set, strongest candidates and strongest neighbors PNs, Ec/Io and cellnames (color coded by neighbor set type).

Graph: The graph shows the aggregate Ec/Io of the Active set, strongest candidates and strongest neighbors over a 40-second, scrolling time window (color coded by neighbor set type).

EvDO Summary Screen

With the EvDO option an additional summary screen is available. Since the EvDO phone is monitoring both the CDMA channel and the EvDO channel an additional summary screen is provided.



CDMA/EAMPS Handoff

An example of the CDMA/EAMPS Handoff screen is shown below.

Serving Channel

Channel	RxAGC	A.EcIo	TxPwr	TxAdj	FER
425	-70	-4	-10	-7	0

mm:ss	Chan	RSSI	AEc	PN1	E1	PN2	PN3	PN4	PN5	PN6
43:40	425	-70	-4	117	-5	66				
43:28	425	-70	-4	66	-7	117				
43:28	425	-66	-4	117	-7	66				
43:19	425	-76	-4	66	-7	117				
43:18	425	-74	-4	117	-5	66				
43:18	425	-78	-8	117	-8					
43:17	425	-85	-6	117	-6					
43:15	425	-79	-8	66	-8					
43:14	425	-82	-5	117	-5					
43:13	425	-89	-9	66	-9					

Prior soft/hard handoffs

3 CDMA Handoffs 6 0008:43:40

Floor Plan Replay

This screen shows the last 10 soft/hard handoffs. The information displayed in the table is the last measured data just prior to the handoff.

The following describes the items in the columns:

- mm:ss - the time in minutes:seconds the handoff occurred
- Chan - Carrier frequency of the channel just prior to the handoff
- RSSI - Received Signal Strength just prior to the handoff
- PN1 - Strongest PN of the Active Set
- PN2 thru 6 - Active Set members

EvDO Handoffs

The following EvDO handoff screen is displayed when performing EvDO testing.

EvDO channel PN SINR TxPwr Sector ID24 (hex) or Cellname

mm:ss	Chan	RSSI	PN1	SINR	PN2	PN3	PN4	PN5	PN6
44:19	1175	-64	117	14					
43:43	1175	-79	117	7	66				
43:39	1175	-84	117						
43:33	1175	-89	117	7	66				
43:23	1175	-75	117	7					
43:23	1175	-75	117	9	66				
43:04	1175	-83	117	6					
42:54	1175	-64							
42:52	No Service								
42:46	1175	-84	117	5	66				
41:59	1175	-77	66	-2					
41:59	1175	-64							

2 EVDO Handoffs 6 0008:44:19

Floor Plan Down | Up Replay

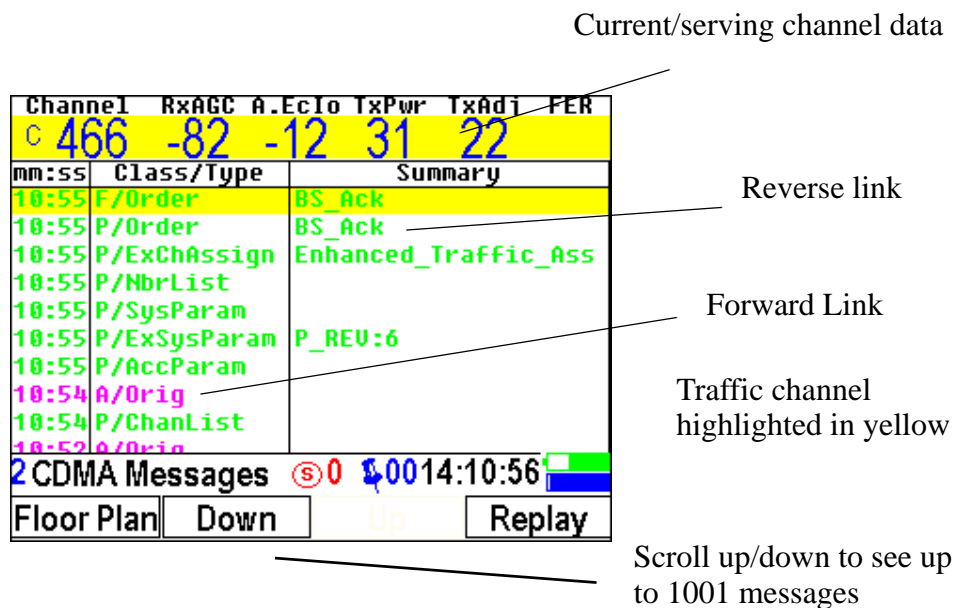
This screen shows the last 10 soft/hard EvDO handoffs. The information displayed in the table is the last measured data just prior to the handoff.

The following describes the items in the columns:

- mm:ss - the time in minutes:seconds the handoff occurred
- Chan - Carrier frequency of the channel just prior to the handoff
- Rssi - Received Signal Strength just prior to the handoff
- PN1 - Strongest PN of the Active Set
- PN2 thru 6 - Active Set members

CDMA Message Screen

An example of the CDMA Message screen is shown below.



The CDMA message screen displays the over-the-air messages. Uplink and downlink messages are colored. Traffic channel messages are highlighted in yellow. Parts of the Order messages are decoded.

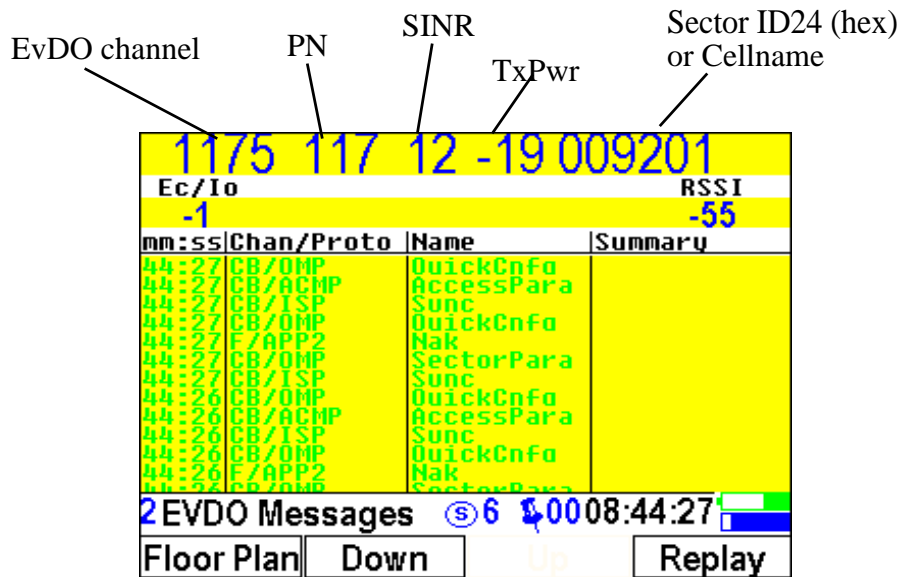
The Class categories are:

- P=Paging
- F=Forward Traffic
- R=Reverse Traffic
- S=Synch
- A=Access

All the messages are logged for further decoding and post-processing.

CDMA EvDO Message Screen

With the EvDO option enabled an additional EvDO message screen is displayed.



The CDMA EvDO message screen displays the over-the-air messages. Uplink and downlink messages are colored. Traffic channel messages are highlighted in yellow.

All the messages are logged for further decoding and post-processing.

PN Call Follow Screen

If the PN Scanner is set to the Call Follow mode, then the following screen will be available for display. This screen shows the current channel information in the top row, the Active Set information just below it, and under that one in the lower row, the Pilot Polluters and Missing Neighbors.

Channel RxAGC A.EcIo TxPwr TxAdj FER													
C 466 -82 -4 -5 -14 0													
Active Set													
PN		EcIo		Cellname		PN		EcIo		Cellname			
98		-5		*.Unknown									
258		-10		*.Unknown									
Pilot						Missing							
Polluters						P: 10		Neighbors User:-20					
PN		PH		SC		Cellname		PN		SC		Cellname	
258		-4		-8		*.Unknown		474		-18		*.Unknown	
								81		-19		*.Unknown	
								96		-19		*.Unknown	
1 PN Scan 1 Follow : 0 0014:08:24													
Floor Plan												Replay	
Missing Neighbors													

The top half of the screen will display the pilot set information collected from the phone, the bottom half of the screen will compare this data to that collected from the scanner.

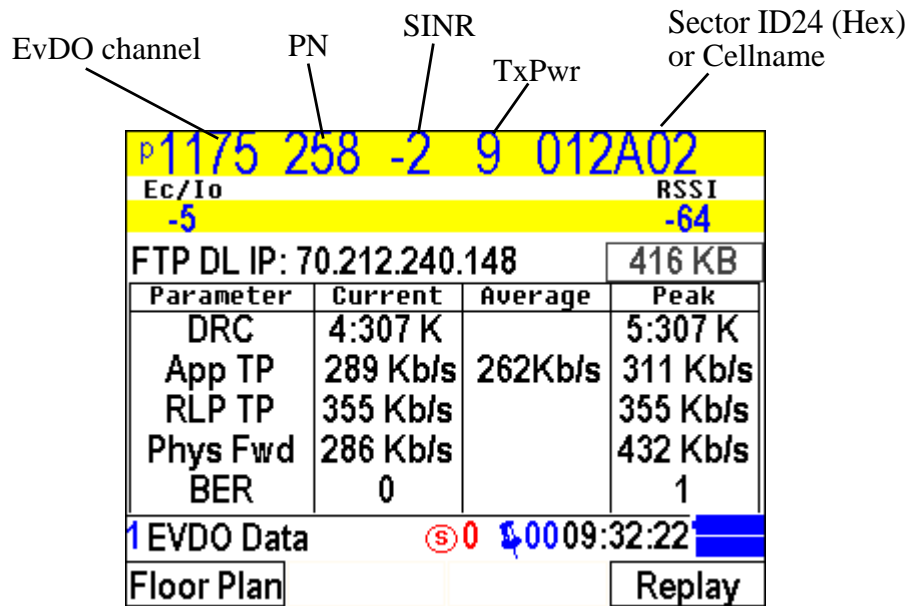
Pilot Pollution Threshold: Identified as a pilot polluter if the PN is not in the Active Set and its level measured by the scanner is within X of the Aggregate Ec/Io of the Active set where X equals the pilot Pollution Threshold. Example: If the Pilot Pollution Threshold is set as +10 dB, then a PN is a pilot polluter if it is within 10dB of the Aggregate Ec/Io. If the Aggregate Ec/Io is equal to -3 and the measured PN is -9 dB, then it is a polluter; however, if the measured PN is -14dB, then it will not be a polluter.

Missing Neighbor Threshold: Threshold value (T_ADD, T_Drop, or USER value) can be used to calculate the threshold. PNs with a measured Ec/Io value above this threshold will be reported as missing neighbors.

Note: the polluters/missing neighbors are cleared each time a new PN scan completes.

CDMA EvDO Data Testing Screen

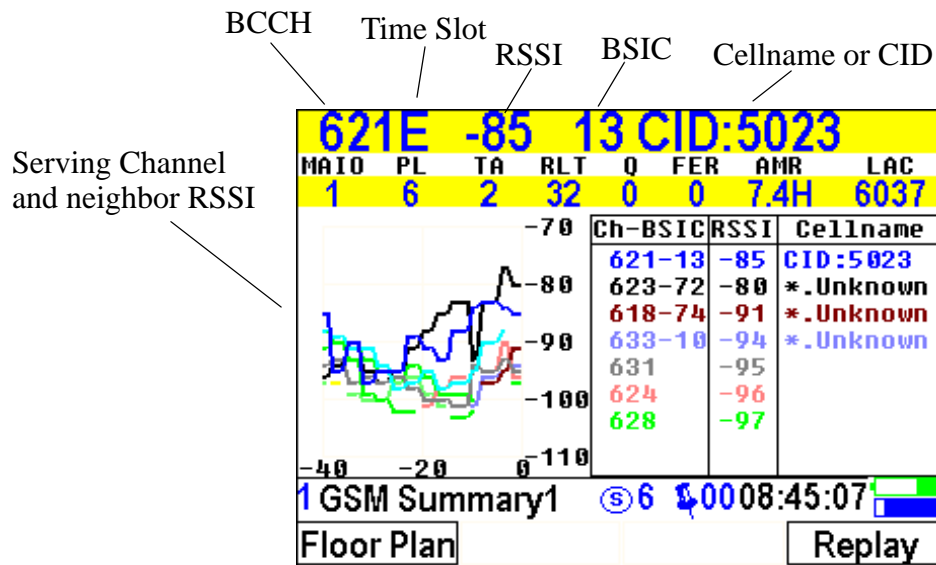
When performing an EvDO data test the following data testing screen is available.



- FTP DL IP: IP address of the phone under test
- DRC: Data Rate Control - The fastest data rate that can be supported. Indicator of the quality of the radio channel.
- APPL TP: Application Layer Throughput
- RLP TP: Radio Link Protocol Downlink Throughput - Essentially the throughput of the RF link.
- Phys Fwd: Throughput of the Physical Layer Forward Path
- BER: Bit Error Rate

GSM Summary 1

The following screen shows the measured data for GSM Summary 1.



Parameters shown are as follows:

- 621 = channel number (ARFCN or BCCH)
- E = Time slot (0=A, 7=G)
- dBm=RSSI Sub (-85)
- BSIC (Base Station Identifier Code)=13
- CID (Cell Identity)=5023
- MAIO (Mobile Allocation Index Offset) = 1
- PL (Mobile Transmit Power)=6
- TA (Timing Advance)=2
- RLT (Radio Link Timeout) = 32
- Q (RxQUAL Sub- Audio quality measurement)=0
- FER (Frame Error rate) = 0
- AMR = 7.4H (Half-rate)
- LAC (Location Area Code) = 6037

GSM Neighbor Screen

The following screen shows the measured data for GSM Summary 2.

Serving channel data (zoom line)

Neighbor RSSI and BSIC

621E -79 13 CID:5023							
MAIO	PL	TA	RLT	Q	FER	AMR	LAC
1	9	2	32	0	0	7.4H	6037
#	Chan	RSSI	BSIC	Cellname			
n1	618	-78	74				
n2	633	-80	10				
n3	619	-90					
n4	623	-90	72				
n5	617	-94					
n6	616	-97	16				

1 GSM Neighbors (S) 6 0008:45:18

Floor Plan Down Up Replay

This screen displays the GSM neighbors in tabular form including the user-defined cellnames. To see the entire GSM neighbor list, use the F2 soft key to scroll through list of channels.

GSM Handoff

An example of the GSM Handoff screen is shown below.

627H -94 76 CID:7373							
MAIO	PL	TA	RLT	Q	FER	AMR	LAC
0	2	3	32	0	0	7.4F	6037
mm:ss	Chan	RSSI	dRSSI	BSIC	N1	RSSI	BSIC
47:52	627H	-94	+0	76	628	-97	
47:39	633H	-101	+14	10	627	-90	76
47:36	633D	-92	-9	10	627	-88	76
47:23	618D	-99	-1	74	633	-90	10
46:53	618B	-75	-2	74	633	-62	10
46:50	618A	-74	-1	74	633	-76	10
46:17	618	-54	+12	74	633	-62	10
46:14	618A	-61	+7	74	633	-60	10
45:43	621E	-75	+22	13	618	-56	74
44:58	621	-84	+1	13	623	-93	72
44:56	621A	-88	+4	13	623	-83	72
44:04	628A	-75	-5	57			
1 GSM Handoffs ⓘ 6 0008:47:53							
Floor Plan		Down		Replay			

Paging channel
is in white

Traffic channel
is in yellow

This screen shows the last 9 handoffs. The information displayed in the table is the last measured data just prior to the handoff.

Description of column headings:

- RSSI - Received Signal Strength just prior to the handoff
- dRSSI - delta in Received Signal Strength (Rssi after minus Rssi before)
- BSIC- BSIC just prior to handoff
- N1 - Strongest neighbor channel just prior to handoff
- RSSI (N1) - RSSI of strongest neighbor channel just prior to handoff
- BSIC (N1) - Color code (BSIC) of strongest neighbor channel just prior to handoff

GSM Messages

An example of the GSM Messages screen is shown below.

617B -83 40 CID:25132							
MAIO	PL	TA	RLT	Q	AMR	LAC	
1	0	2	32	7	4.75H	6037	
Tech		mm:ss	Direction.Channel/Type				
G	32:46	U.SAC/MEASURE_REPORT					
G	32:46	D.SAC/SYS_INFO_5					
G	32:46	U.SAC/MEASURE_REPORT					
G	32:46	D.SAC/SYS_INFO_5					
G	32:46	D.NAS/ALERTING					
G	32:45	U.SAC/MEASURE_REPORT					
G	32:45	D.SAC/SYS_INFO_6					
G	32:45	U.SAC/MEASURE_REPORT					
G	32:45	D.SAC/SYS_INFO_5					
1 OTA Messages		S 0		11:32:46			
Floor Plan		Down		Up		Replay	

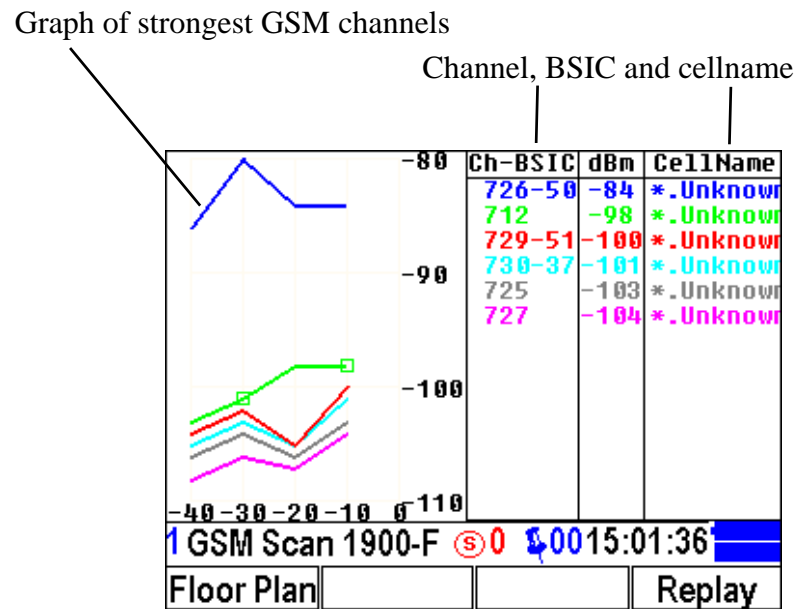
Paging channel
is in white; Traffic
channel messages
in yellow.
Forward and reverses
traffic channels are
colored

User can scroll to view
last 1001 messages

Over-the-air GSM messages are displayed and logged. The user can use the
function keys to scroll and view the last 1001 messages

GSM RSSI/BSIC Scanning Screen

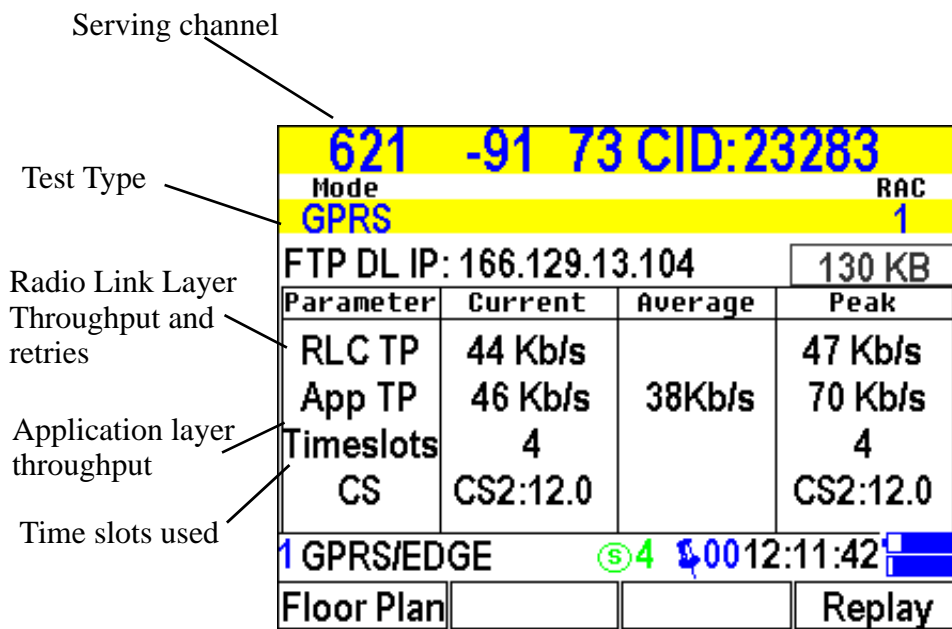
This screen requires the GSM RSSI/BSIC scanning option to display. The following screen displays the GSM scanning information.



The user can select to decode BSIC or not. The BSIC will not be displayed if the user chooses not to decode the BSIC. The user-defined cellname will be displayed.

GPRS/EDGE Data Testing Screen

An example of the GPRS/EDGE Data Testing screen is shown below.



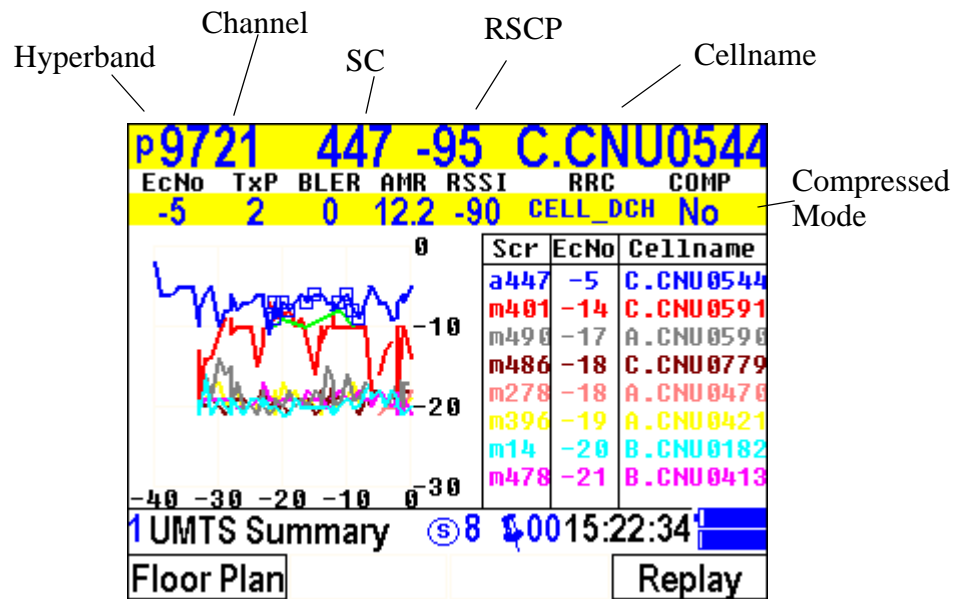
Three tests are performed http download, ftp upload and ftp download. The current average and peak values for the session are displayed and logged.

Below is a description of the displayed parameters.

- FTP DL IP: IP address of the phone under test
- RLC TP: Radio Link Control Layer Throughput
- APPL TP: Application Layer Throughput
- Timeslots: Time Slots used
- CS: Coding Scheme

UMTS Summary - Graph

An example of the UMTS Summary Graph screen is shown below.



The screen elements consist of the following:

- Hyperband: c= 800 MHz, p= 1900 MHz, u=2100 MHz, g=900 MHz
- Channel: Channel number
- SC: Scrambling Code of Best Server
- RSCP: Signal strength of the best server
- Cellname
- Neighbors: Displays the neighbors from best to worst Ec/No.
 - The scrambling code will have either an “a” or “m” prefix. The “a” represents the active scrambling code. The “m” represents the monitored scrambling code.
 - This screen will list only the neighbors that the phone has been able to measure a Ec/No value.

UMTS Neighbors

An example of the UMTS Neighbor screen is shown below.

Hyperband	Channel	SC	RSCP	Cellname
p9721	447	-98	C.CNU0544	
EcNo	TxP	BLER	AMR	RSSI
-6	1	0	12.2	-92
RRC	COMP			
CELL_DCH	No			
#	Scr	EcNo	RSCP	Cellname
a1	447	-6	-98	C.CNU0544
m1	490	-14	-106	A.CNU0590
m2	401	-17	-109	C.CNU0591
m3	14	-19	-111	B.CNU0182
m4	478	-19	-111	B.CNU0413
m5	378	20	442	A.CNU0470
1 UMTS IntraFreq 8 0015:22:36				
Floor Plan	Down	Up	Replay	

The screen elements consist of the following:

- Hyperband: c = 800 MHz, p= 1900 MHz, u=2100 MHz, g=900 MHz
- Channel: Channel number
- SC: Scrambling Code
- RSCP: Signal strength of the best server
- Cellname
- Neighbors: Displays the neighbors from best to worst Ec/No.
- The scrambling code will have either an “a” or “m” prefix. The “a” represents the active scrambling code. The “m” represents the monitored scrambling code.
- This screen will list the entire neighbor set, including those scrambling codes where no Ec/No can be measured. Use the F2 button to scroll through the list of neighbors.

UMTS/HSDPA Data Testing

An example of the HSDPA Data Testing screen is shown below.

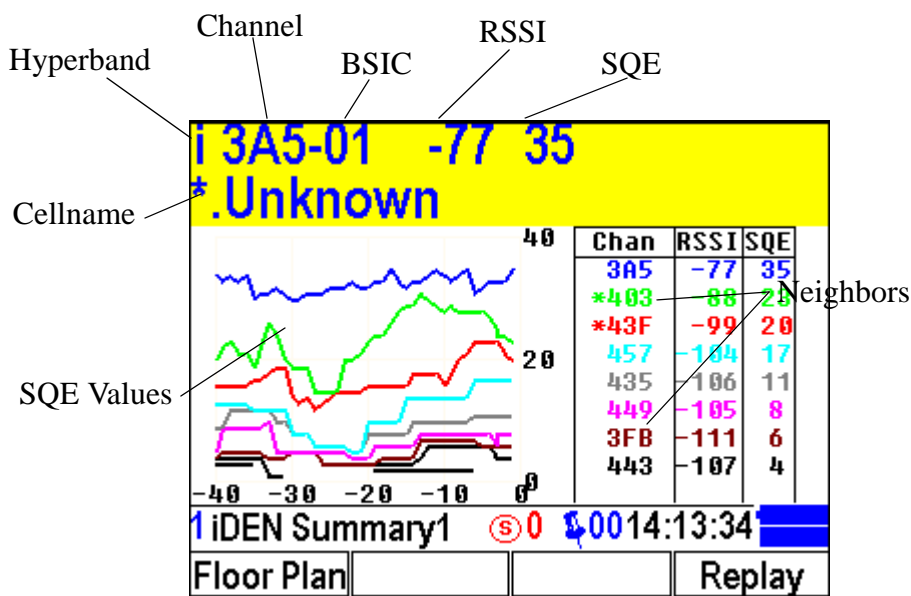
Hyperband	Channel	SC	RSCP	Cellname
	p9721	447	-101*	AMBIG
Status Line	Mode	EcNo	TxP	BLER
	HSDPA	-6	3	0
	FTP DL IP: 166.129.232.191			2048 KB
	Parameter	Current	Average	Peak
	App TP	809 Kb/s	810Kb/s	1091 Kb/s
	RLC TP	780 Kb/s		1215 Kb/s
	MAC TP	875 Kb/s		1238 Kb/s
	BLER	0		1
	CQI	20		21
	1 UMTS/HSDPA Data (S) 0 11:09:45			
	Floor Plan			Replay

The screen elements consist of the following:

- Hyperband: c = 800 MHz, p= 1900 MHz, u=2100 MHz, g=900MHz
- Channel: Channel number
- SC: Scrambling Code
- RSCP: Signal strength of the best server
- Mode: Either UMTS or HSDPA.
- Status Line: IP address assigned to the mobile.
 - FTP DL: FTP download test
 - FTP UP: FTP upload test
 - HTTP DL: HTTP download test
- App TP: Application Throughput. Current value represents the last 5 second of the transfer, Average value represents the average for the entire file.
- RLC TP: Radio Link Throughput
- MAC TP: MAC Layer Throughput
- BLER: Block Error Rate
- CQI: Call Quality Index

iDEN Summary 1 - Graph

An example of the iDEN Summary Graph screen is shown below.

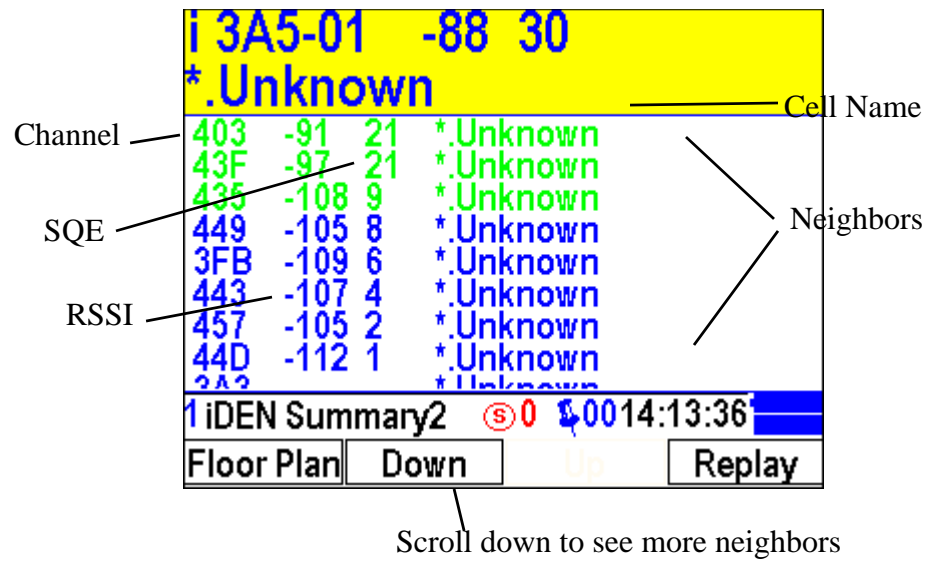


The screen elements consist of the following:

- Hyperband: i = 800 MHz, k = 900 MHz
- Channel: Channel number in Hex
 - “*” represent foreground neighbors
 - Serving channel represented in blue
- BSIC: Base Station Identifier Code
- RSSI: Signal strength of the serving cell in dBm
- SQE: Signal Quality Indicator
- Cellname
- Neighbors: Displays the neighbors from best to worst SQE.
 - The background neighbors are represented with an “*” as a prefix to the channel number.

iDEN Summary 1 - Table

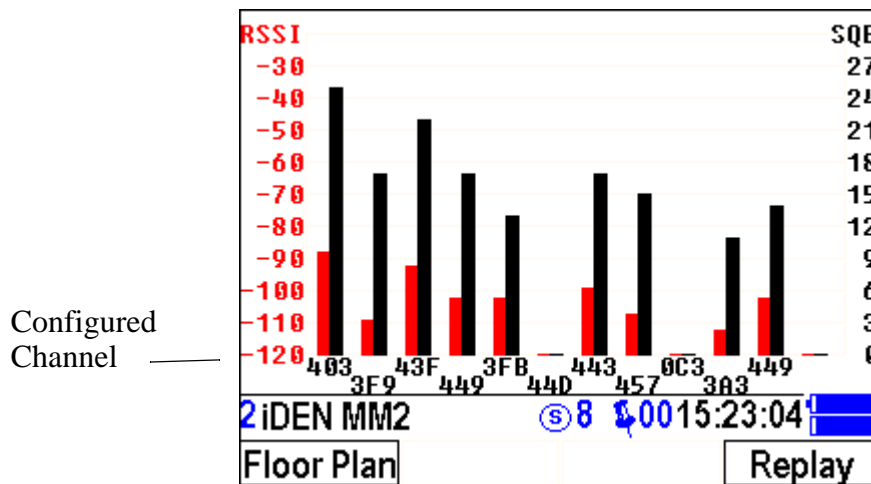
An example of the iDEN Summary Graph screen is shown below.



Green neighbors represent foreground; blue represents background neighbors.

iDEN Monitor Many

An example of the iDEN Monitor Many screen is shown below.



The screen elements consist of the following:

- The channels that were configured to scan will be listed on the lower axis and two key parameters will be showed in a the bar graph; RSSI and SQE.
- RSSI: value in red with the scale shown on the left side of the graph
- SQE: value in Black with the scale shown on the right side of the graph.

Up to 12 channels can be viewed simultaneously

The double-left arrows increment backwards in time to the nearest event or 30 seconds, whichever comes first. The double-right arrows do the same in the forward direction. The single arrow is Play. When data is playing the single arrow turns into a double line which is the Pause button.

To identify where you are in time press the Enter key (while in Replay mode) and the following screen will appear.

mm:ss	Phone	Type of Event	Value
06:20	1	Low ECIO	-3
06:22	1	High TxPower	4
06:33	1	High FER	2
07:21	1	Low ECIO	-5
07:45	1	High TxPower	20
The [ENT] button toggles this screen.			
09:06:06		09:08:07	
1 Replay Status		S 0 00 09:06:22	
<<		>>	
>		Real Time	

The top half shows the events that have occurred. The blue bar across the middle-bottom part of the screen indicates your current position in time relative to the amount of data stored. In this case you are near the beginning of the data. If the blue bar is filled then you would be near or at the end of the data (time when you entered Replay). You can use the arrow keys to maneuver the time at which you want to start Replay.

Press Enter to exit this screen and view the other screens.

To go back to Real time press the F4 (Real Time) function key.

Audible Alerts

The user can set up audible alerts. See “Device Setup” beginning on page 38

To view the alerts the following screen is displayed:

627A -90 76 CID:7373			
TA		LAC	
25		6037	
mm:ss	Alert Type	Lvl	Threshold
47:25	High RX Qual	1	> 0
47:22	Block Call		
45:46	High FER	1	> 0
45:12	High RX Qual	1	> 0
44:03	Loc Area Uodat		
1 Phone Alerts \$6 \$0008:48:21			
Floor Plan		Replay	

This screen shows the time of the alert, alert type, the value measured and the threshold set by the user. When an alert occurs a voice announcement is played through the display speaker.

Log Memory

Log data is stored directly to the compact flash card in the directory /zk/logs.

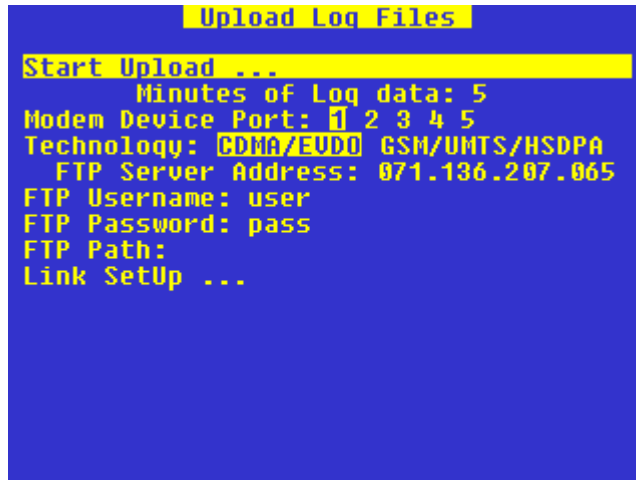
Data is stored in 30-minute or one-session-length files, whichever is less. When the disk is full the oldest log file is deleted and replaced by the newest log file.

Log data is an ASCII comma-delimited format. Contact ZK Celltest for a detailed description of the log file format.

For mapping, the log files can be imported by most 3rd party Post Processing Applications. For a complete list of Partners, please visit our website at: <http://www.zk.com>.

Log File Upload -- Remote Data Link

The user can configure the SAM to send data files to a centralized server.

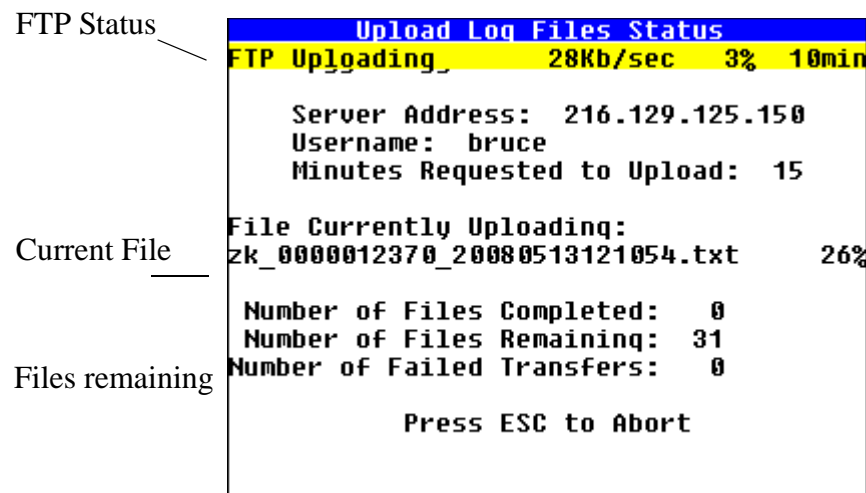


1. Configure the number of minutes of log data that you would like to upload.
2. Select the port that the modem is attached.
3. Select the technology for the modem.
4. Set the ip address of the FTP where ou want the data to be sent.
5. Set the username, password, and path for the FTP server.
6. The Link Set up is shared with the settings in the data testing configuration menu.

To begin he process, select, "Start Upload ..."

Log File Upload Status

The user can configure the SAM to send data files to a centralized server.

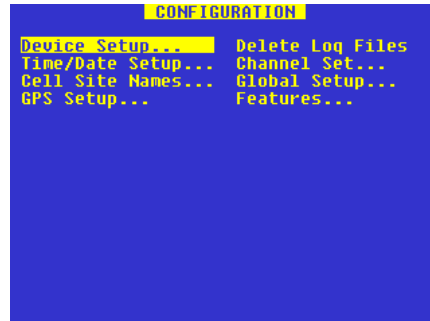


1. The status bar will provide information on current throughput speed with an estimate of the amount of time left in the process.
2. When the process is complete, hit ENT to return to the menu

Configuration Menus

Some menu items may not appear if their associated option has not been purchased. For example, if you did not purchase the CDMA technology option then CDMA Cellnames will not appear in the menu.

When CONFIGURATION is selected from the main menu, the following screen is displayed.



Delete Log Files

This function is used to clear the data on the Compact Flash card.

Device Setup

In the Configuration menu select Device Setup to configure the ports. This menu allows you to configure ports for the user-selected data collection devices.

When selected the following screen will appear:



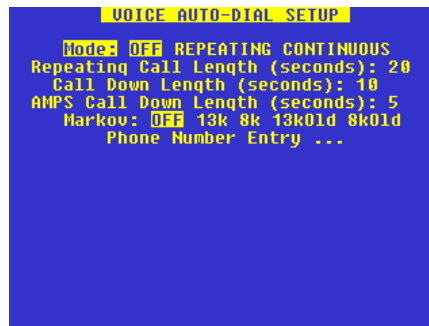
Setting up a CDMA Phone

The following screen allows the user to set up a CDMA phone as Device #1.



The autodial can be set up and the phone number can be entered by the user. In addition, the user can choose to log CDMA Over-the-Air messages.

By pressing the Voice Auto Dial Setup . . . menu item the following menu appears:



The autodial mode can be repeating, continuous, or turned off . When the mode is set for repeating, the call length must be set. When the unit is in the SAM-ALL mode the phone will continue to make repeated calls. The phone will stop autodialling when the unit is not in the SAM-ALL mode.

The call down length can be set differently for CDMA calls and analog calls. In some networks, when the phone is on an analog voice channel, the phone requires at least 10 seconds of call down time (time in idle mode) prior to initiating the next call in order to go back into digital mode. If the call down time for AMPS is set too low the phone can get “stuck” in analog mode for repeated calls. We suggest this parameter to be set at no less than 20 seconds.

For the CDMA phones the Markov call option is available.

NOTE: The phone and the infrastructure must support the selected Markov mode for this to function properly.

Alerts Setup

When you select the Alerts Setup . . . the following screen appears.



ALERTS SETUP	
TYPE	SOUND
BlockCall	OFF
DropCall	OFF
FER > 0	OFF
Avg EcIo < 0	OFF
Tx Pwr > 0	OFF

To change the thresholds highlight the parameter and press the ENT key. Brackets appear around the selection. Use the arrow keys to change the threshold values and press the ENT key to save.

To toggle the sound, highlight and press the ENT key. If it is in the ON position and an alert occurs a voice announcement will be heard when in the SAM-ALL realtime mode.

The alert threshold is compared to an average of the parameter over a 5 second period and if exceeded then an alert is generated. Further, in order to prevent multiple alerts of the same type occurring in a short period of time a 60 second squelch period is applied to that alert.

Setting up a CDMA Phone for Data Testing

The following screen allows the user to set up a CDMA phone for data call testing. The phone must be programmed for data testing service from the carrier.

Make sure you have enabled data testing. To enable features See “Features . . .” on page 64.

In the Device #1 Setup menu select “CDMA” and “Data testing Setup . . .” and press ENTER. The following screen will appear.



Data Testing:

Data testing can be turned OFF or ON. With data testing turned off the phone will still log voice data.

NOTE: When this feature is turned on it overrides the Voice Auto Dial Settings.

Auto Redial:

A single data test session consists of a FTP Upload, FTP Download and an HTTP- download. With Auto redial turned ON the call will be terminated and re-originated after each data test session. With Auto redial turned OFF the call will be continuous and the data session will continue to repeat until the call is dropped or terminated by the user. After the call is terminated it will attempt to re-originate.

FTP Upload:

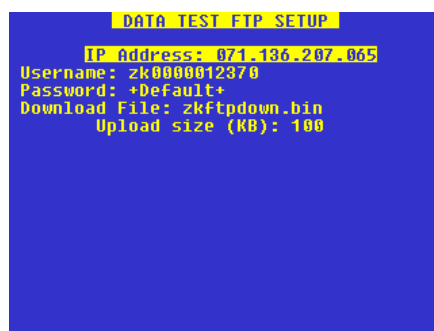
The first of three data tests performed. This test can be individually turned ON or OFF.

FTP Download:

The second of three data tests performed. This test can be individually turned ON or OFF.

FTP Setup . . .:

Allows the user to set up the FTP session parameters. Highlighting FTP and pressing ENTER displays the following screen:



The unit ships with settings defaulted to the ZK FTP servers. Ninety days of service are free at the time of purchase of the data testing feature. Additional access to the ZK servers must be purchased.

Users can set up their own FTP server, however, the FTP settings for the IP Address, Username, password and download file must match the settings on the FTP server. The user can change the size of the file that is used for the FTP upload.

Note: The default password for the ZK Server is hidden. If you are using the ZK server service and your usage time runs out you need to contact ZK to extend the service.

HTTP Test:

The third of three data tests performed. This test can be individually turned ON or OFF.

HTTP Test Setup . . .:

Allows the user to set up the HTTP session parameters. Highlighting DATA TEST HTTP SETUP and pressing ENTER displays the following screen:

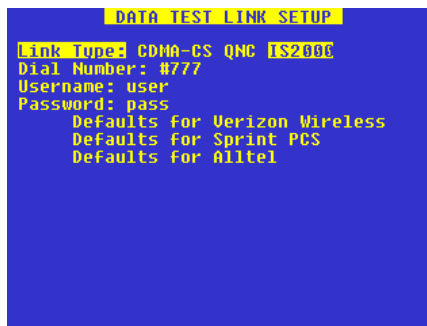


The unit ships with settings defaulted to the ZK HTTP servers. Ninety days of service come free with the purchase of the data testing feature. Additional usage time for the ZK servers must be purchased.

Users can set up their own HTTP server, however, the HTTP settings for the IP Address and download file must match the settings on the HTTP server.

Link Setup . . .:

Allows the users to set up the wireless link parameters. Highlighting this and pressing ENTER displays the following screen.



Link Type: The user can choose the type of data call to make.
CDMA-CS = circuit switched CDMA
QNC = Quick Net Connect

IS2000 = 1XRTT/EVDO (sometime referred to as 2.5G or 3G)

DialNumber: This is the phone number that the phone dials to establish a data call. Contact the network provider for the correct number.

Username: This is the username required for the phone to log into the wireless data network. Contact the network provider for the correct username.

Password: This is the password required for the phone to log into the wireless data network. Contact the network provider for the correct password.

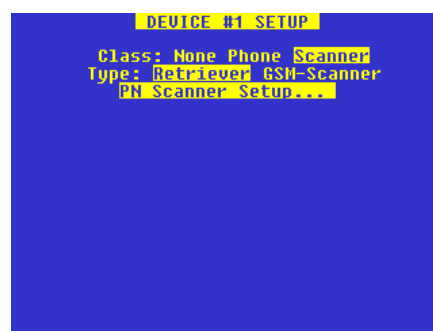
Default Setup . . .:

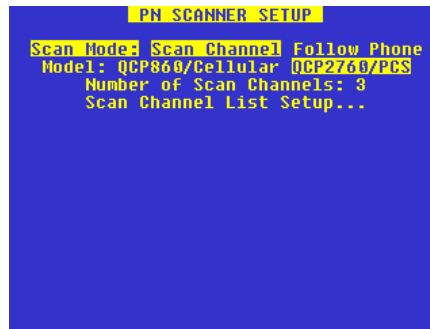
This selection will default all of the data testing settings back to using the ZK Servers for FTP and HTTP (factory defaults).

NOTE: Default settings will NOT work for the Link Setup. The “Link Setup” needs to be configured as it is dependent on the service provider and the phone.

Setting up the Retriever Phone (PN Scanner)

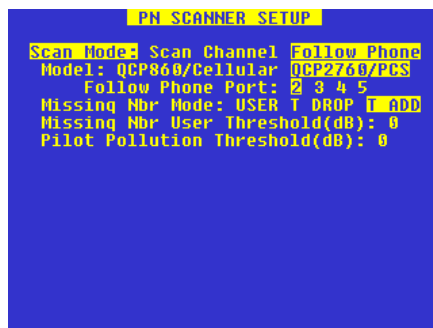
By selecting the Retriever in the Phone Setup menu and the Scan_Channel mode the following screen will appear.





There are two modes for the Retriever. In Scan_Channel mode the Retriever scans all PNs in up to five user-defined carrier channels. The PN Increment can be any number from 1 to 15. This value should be equal to the PN Increment set in the infrastructure. Typically, this value is either 2 or 3. If you are not sure what the setting should be, use 1. When the PN Increment is 1 then all 512 PNs are scanned in each channel. When it is set to 2, then every other PN is scanned, and so on. The higher the PN Increment value the faster the scanning speed, however, only incrementally faster. Typical scanning speed for a single carrier with a PN Increment of 2 is approximately 4 seconds.

The following screen shows the setup menu for a Retriever in the Follow_Mode.



In this mode the Retriever can be configured to follow a CDMA phone (follow phone) connected to another port. The follow phone makes voice or data calls and the Retriever scans the PNs on the same carrier channel as the follow phone. In addition, the Retriever is using the same PN Increment that the follow phone is told to be used by the network.

The retriever compares the Ec/Io values of the PNs it scans with the follow phone's neighbor list and values. If there are PNs that are stronger than the Missing Neighbor threshold and are not in the neighbor list then they are Missing Neighbors. There are three modes for the Missing Neighbor Threshold as follows:

- USER - In this mode the user chooses a fixed value in Ec/Io (dB). When the Retriever measures detects a PN that is not in the Neighbor list AND is stronger than the threshold it is displayed and logged as a Missing Neighbor.
- T_DROP - The unit obtains the value of T_DROP from the follow phone. The T_DROP value is used as the Missing Neighbor threshold. When the Retriever measures detects a PN that is not in the Neighbor list AND is stronger than T_DROP it is displayed and logged as a Missing Neighbor.
- T_ADD - The unit obtains the value of T_ADD from the follow phone. The T_ADD value is used as the Missing Neighbor threshold. When the Retriever measures detects a PN that is not in the Neighbor list AND is stronger than T_ADD it is displayed and logged as a Missing Neighbor.

If there are PNs that are not in the Active Set and are within the range of the Pilot Pollution threshold then they are Pilot Polluters. The Pilot Pollution threshold value is set by the user. Pilot polluters can come from PNs in or not in the follow phone's Neighbor list.

A PN is a Pilot Polluter when the Aggregate Ec/Io of the Active Set minus the Ec/Io of the measured PN is lower than the Pilot Pollution threshold.
 $(\text{Agg. Ec/Io} - \text{PN Ec/Io}) < \text{Pilot Pollution Threshold}$.

For example, if the Pilot Pollution threshold is +5dB, the Aggregate Ec/Io of the Active Set is -6dB and the measured PN is -10dB the PN is a Pilot Polluter. $[-6 - (-10) = +4]$ As you can see, +4 is less than +5 so the PN is a Pilot Polluter.

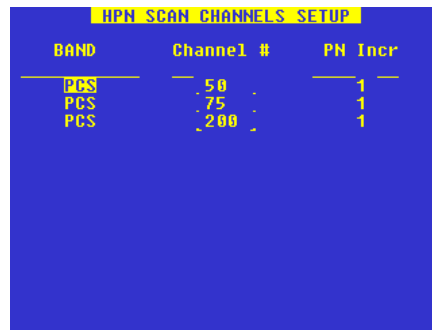
Setting up the High Performance HPN (PN Scanner)

To setup the Comarco PN Scanner on the ZK-MPS select “Scanner” and “HPN” on the following screen.



There are two modes for the HPN. In Scan_Channel mode the HPN scans all PNs in up to three user-defined carrier channels. The PN Increment can be any number from 1 to 15. This value should be equal to the PN Increment set in the infrastructure. Typically, this value is either 2 or 3. If you are not sure what the setting should be, use 1. When the PN Increment is 1 then all 512 PNs are scanned in each channel. When it is set to 2, then every other PN is scanned, and so on. Typical scanning speed for all configured carriers will be once per second.

Selecting the “Scan Channel List Setup” displays the following screen where the user can enter the channels to scan and the band. The unit will log the top 25 PNs in each channel.



BAND	Channel #	PN Incr
PCS	50	1
PCS	75	1
PCS	200	1

Setting up a GSM/UMTS Phone

The following screen allows the user to set up a GSM phone as Phone One.



Select the Device Manufacturer, either Nokia or Other. For any Qualcomm chipset phone, select Other.

The autodial can be set up and the phone number can be entered by the user. In addition, the user can choose to log over-the-air GSM messages.

Alerts Setup - When you select the Alerts Setup . . . the following screen appears.

ALERTS SETUP	
TYPE	SOUND
BlockCall	OFF
DropCall	OFF
FER > 0	OFF
Rx Qual > 0	OFF
RSSI < -120	OFF

MORE UMTS ALERTS SETUP	
TYPE	SOUND
Location Area Update	OFF
2G->3G Reselect	OFF
Compressed Mode Est.	OFF
Compressed Mode End	OFF
3G->2G IRAT Handover	OFF

To change the thresholds highlight the parameter and press the ENT key. Brackets appear around the selection. Use the arrow keys to change the threshold values and press the ENT key to save.

To toggle the sound, highlight and press the ENT key. If it is in the ON position and an alert occurs a voice announcement will be heard when in the SAM-ALL realtime mode.

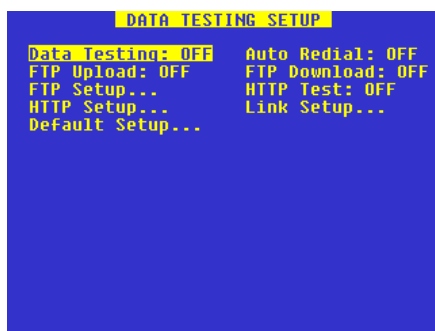
The alert threshold is compared to an average of the parameter over a 5 second period and if exceeded then an alert is generated. Further, in order to prevent multiple alerts of the same type occurring in a short period of time a 60 second squelch period is applied to that alert.

Setting up a GSM phone for GPRS/EDGE/UMTS/HSDPA Data Testing

The following screen allows the user to set up a GSM/UMTS phone for data call testing. The phone must be programmed for data testing service from the carrier.

Make sure you have enabled data testing. To enable features See “Features . . .” on page 64.

In the Phone Setup menu select “GSM” and “Data testing Setup . . .” and press ENTER. The following screen will appear.



Data Testing:

Data testing can be turned OFF or ON. With data testing turned off the phone will still log voice data.

NOTE: When this feature is turned on it overrides the Voice Auto Dial Settings.

Auto Redial:

A single data test session consists of a FTP Upload, FTP Download and an HTTP- download. With Auto redial turned ON the call will be terminated and re-originated after each data test session. With Auto redial turned OFF the call will be continuous and the data session will continue to repeat until the call is dropped or terminated by the user. After the call is terminated it will attempt to re-originate.

FTP Upload:

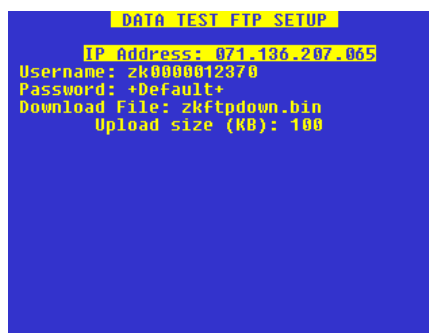
The first of three data tests performed. This test can be individually turned ON or OFF.

FTP Download:

The second of three data tests. This test can be individually turned ON or OFF.

FTP Setup . . .:

Allows the user to set up the FTP session parameters. Highlighting FTP and pressing ENTER displays the following screen:



The unit ships with settings defaulted to the ZK FTP servers. Ninety days of service are free at the time of purchase of the data testing feature. Additional access to the ZK servers must be purchased.

Users can set up their own FTP server, however, the FTP settings for the IP Address, Username, password and download file must match the settings on the FTP server. The user can change the size of the file that is used for the FTP upload.

Note: The default password for the ZK Server is hidden. If you are using the ZK server service and your usage time runs out you need to contact ZK to extend the service.

HTTP Test:

The third of three data tests performed. This test can be individually turned ON or OFF.

HTTP Test Setup . . .:

Allows the user to set up the HTTP session parameters. Highlighting DATA TEST HTTP SETUP and pressing ENTER displays the following screen:

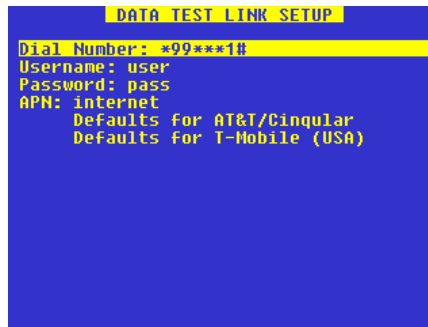


The unit ships with settings defaulted to the ZK HTTP servers. Ninety days of service come free with the purchase of the data testing feature. Additional usage time for the ZK servers must be purchased.

Users can set up their own HTTP server, however, the HTTP settings for the IP Address and download file must match the settings on the HTTP server.

Link Setup . . .:

Allows the users to set up the wireless link parameters. Highlighting this and pressing ENTER displays the following screen.



DialNumber: This is the phone number that the phone dials to establish a data call. Contact the network provider for the correct number.

Username: This is the username required for the phone to log into the wireless data network. Contact the network provider for the correct username.

Password: This is the password required for the phone to log into the wireless data network. Contact the network provider for the correct password.

APN: The network APN must be entered here.

Default Setup . . .:

This selection will default all of the data testing settings back to using the ZK Servers for FTP and HTTP (factory defaults).

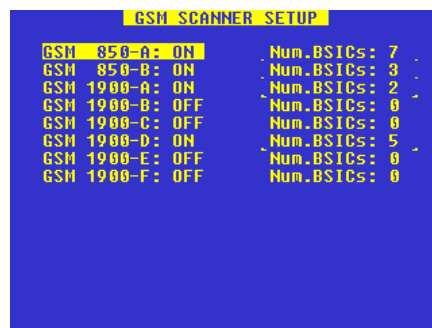
NOTE: Default settings will NOT work for the Link Setup. The “Link Setup” needs to be configured as it is dependent on the service provider and the phone.

Setting up the GSM Scanner Phone

By selecting the Scanner in the Phone Setup menu the following screen will appear.



Selecting “GSM Scanner Scanning Setup . . .” will display the following screen:



The user may turn scanning on and off for each band. In addition, the user can program the number of strongest RSSI channels to perform a BSIC decode.

NOTE: Decoding the BSIC significantly reduces the scanning speed.

User-defined channels for GSM Scanning

By selecting “GSM Channel list . . .” on the previous screen the user can load in a defined channel list for the scanner to scan.



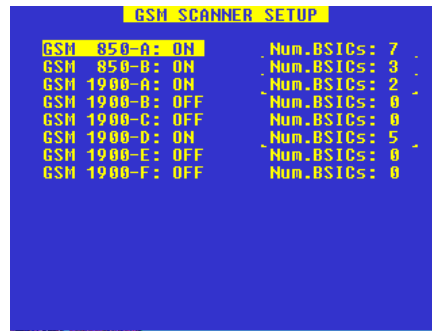
To create a user-defined channel list select “Export” to export the default template to the export folder on the flash card. Turn the unit off and remove the flash card and insert it into your PC and edit it with a text editor or Excel. Save the file as a comma delimited ASCII text file named gsm_channels.txt and place it in the import folder on the flash card. Go back to the screen shown above and select “import” to import the new channel list into the main memory.

Setting up the High Performance HRG (BSIC Scanner)

To setup the Comarco BSIC Scanner on the ZK-MPS select “Scanner” and “HPN” on the following screen.



Selecting the “GSM Scanner setup” displays the following screen where the user can enter the channels to scan and the band.

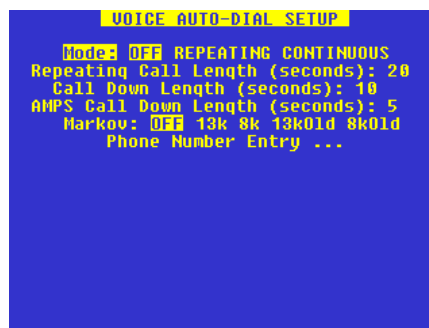


Setting up an iDEN Phone

In the Device Setup menu select 'Phone' and 'iDEN' as shown below. The phone can be configured as either a normal phone, or as a scanner.



To configure the phone settings, select Normal mode, then select Voice Auto Dial Setup . . . The following menu appears:



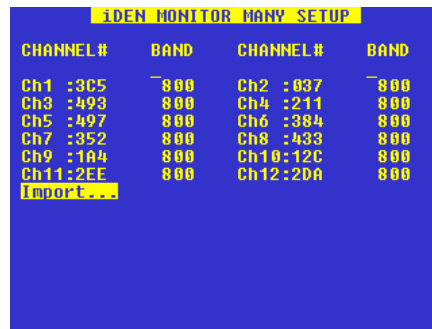
The autodial mode can be repeating, continuous, or turned off. When the mode is set for repeating, the call length must be set. When the unit is in the SAM-ALL mode the phone will continue to make repeated calls. The phone will stop autodialling when the unit is not in the SAM-ALL mode.

In addition, the user can choose to log iDEN Over-the-Air messages.

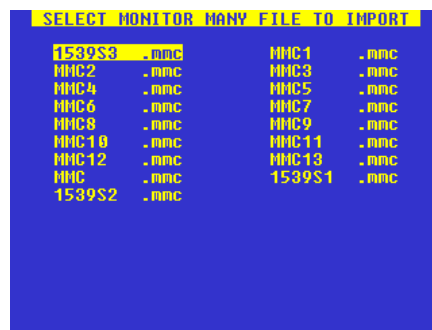
To configure the iDEN phone scanner, select the Monitor Many mode.



Configure the channels for the scanner, select Monitor Many Setup and enter up to 12 channels:



If you would like to import a pre-defined channel list, select Import from the menu and select the file:



GSM/CDMA/iDEN Cell Site

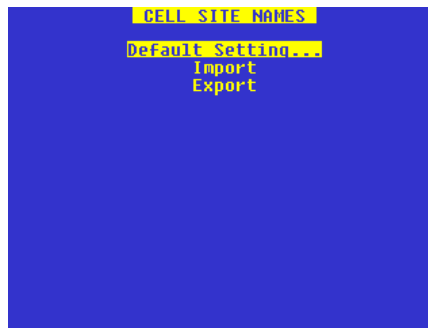
NOTE: A maximum of 20,000 cellsite names can be stored. A three-sector cell will use three cellsite names.

See “Appendix A - Cellsite File Format v4.4” on page A-1 for the file format of the cellsite.txt file.

The Cellsite feature allows users to define their own names of the cell or sector for CDMA, GSM or iDEN cells. A table is provided that stores the cellsite information. Default tables are pre-loaded. For an example of the default cellsite table. This table can be transferred to a PC to use as a template for editing and imported back into the unit. The name of the cell or sector will be displayed based on its hyperband and PN (CDMA), BSIC or channel number (GSM), channel number (iDEN), or SC (UMTS).

If more than one cellname has the same PN, BSIC or channel number (depending on the technology) and hyperband then the unit chooses the closest cellsite name to the current location of the unit by comparing the current GPS position of the unit with the GPS positions of the cell site via the cellsite.txt file.

By highlighting Cell Site Names. . . in the Configuration menu and pressing the enter key the following screen will be displayed.

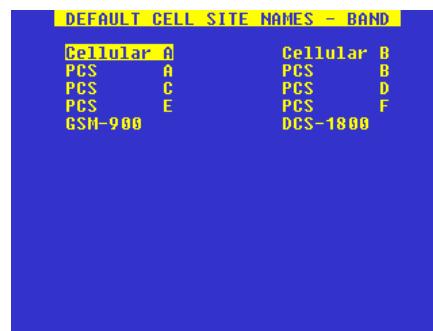


Default settings are pre-loaded. By highlighting “Default Setting . . .” and pressing ENTER, the following screen will appear.

The user selects the technology in the following screen.



By selecting GSM in the previous screen the following screen appears.



The user can select any of the default items corresponding to their frequency band. For GSM the default cellnames consist of “NAMEXX” where “XX” is the BSIC value. For CDMA the default cellnames consist of “NAMEXXX” where “XXX” is the PN Offset value.

By selecting iDEN in the Default Cell Site Names screen the following screen appears:



If iDEN 800 is selected then the default cell names will consist of “iDENXX_YYY” where XX is either 800 or 900 and YYY is the channel number.

See “Appendix A - Cellsite File Format v4.4” on page A-1 for the file format of the cellsite.txt file..

Users can create their own cellname table by exporting the default table and using it as a template to add their cellnames of choice. To export a cellname file to the PC select Export and the file will be placed in the /ZK/EXPORT directory on the Compact Flash card with the file name cellname.txt.

IMPORTANT: The cellsite name can consist only of the following characters: "A-Z", "0-9", "-", or "_". Space characters are NOT allowed. Using other characters is not supported, and will cause unpredictable results.

NOTE: Up to 20 characters can be stored and logged for the cellsite name and up to 4 characters for the sector ID. Screen space and character width will dictate the number of characters displayed on the screen. Typically 8 cell site name characters and 2 sector ID characters will be displayed.

The cellsite table can be modified with a text editor and imported back into the unit. When modifying the cellsite table on your PC it is recommended you use a non-formatting text editor such as Notepad or WordPad to make your changes. Make sure you save it as a text file or MSDOS text file when using these programs. If you use Word to edit your text be sure to save the file as MS-DOS text for the file type. If you use Excel make sure you save it as a comma-delimited CSV text file.

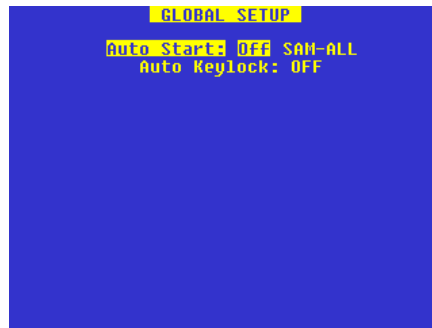
To import a cellname table from the PC copy the cellsite.txt file from your PC onto the Import directory of the Compact Flash card, Insert the card into the unit, turn it on and select Import from the CDMA Cellname configuration menu.

NOTE: The file must be named cellsite.txt and placed in the import directory on the flash card. Then the user must import the file using the import command in the “Cell Site Names” menu.

The cellsite names are logged in the PC, PS and HC messages.

The cellsite names are displayed on the CDMA and GSM Summary screens.

Global Setup



Auto Start

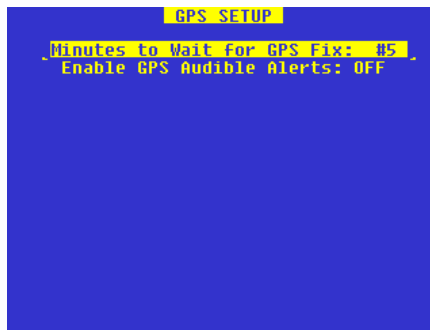
This tells the unit to automatically go to the SAM-ALL screens or the Select Channel screens after the unit is powered on. You can disable this by selecting “Off”.

Auto Keylock

When enabled this feature turn off functionality of the keypad (except the ESC key) while in SAM-ALL mode and driving more than 5mph. This is a safety feature.

GPS Setup . . .

This screen is only available on units with the GPS option.



Use the ENTER key to change to the number of minutes the unit may wait to obtain a GPS before automatically going into data collection mode. Use the arrow keys to change in a range of 0 to 45 minutes, then press enter.

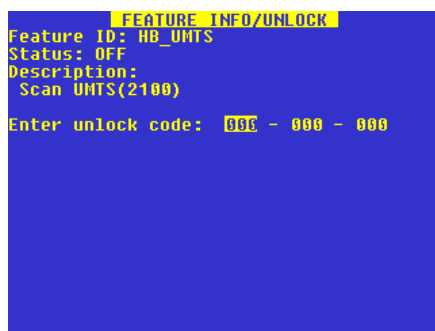
Audible alerts that inform the user when a loss of GPS signal occurs can be turned on or off.

Features . . .

The unit can be configured with a combination of phone ports and technology. To enable any of these features you must purchase the option from ZK Celltest. If you have purchased any of these options on a new unit or sent your unit in for a hardware upgrade along with buying any of these options then ZK will enable these features for you at the factory. If you want to purchase the option and would like to enable the feature yourself, then you will need to contact ZK and provide your Purchase Order reference number and the serial number of your unit. A ZK representative will send you a 9- digit number. When you receive the 9-digit number, select the feature you want to enable on the following screen and press enter.



In the screen above we highlight “Phone3: DISABLED” and press ENTER. The following screen appears.



Enter the Unlock Code and press ENTER. The feature will now be enabled.

Appendix A - Cellsite File Format v4.4

NOTES:

- 1) ZK-SAM/ZK-MPS with 9.4 firmware or newer supports a maximum of 24,320 cellnames. The limit was 3000 in 8.x, 9.0 and 9.2 firmware versions.
- 2) With a GPS capable unit the current position is compared to the cell's latitude/longitude as entered into the table to determine the closest co-color code cellsite record.
- 3) When a GPS fix is not available the cellsite name displayed is NOT guaranteed to be the correct one.
- 4) Not all fields/options are supported by all products, for example RMS mapping software supports more fields/options than ZK-SAM.

All files must conform to the ZK Celltest standard file format as defined elsewhere. For example all files must begin an appropriate @START line and end with an @END line.

Cellsite File Format

Field #	Field Name	Example	Units	Min	Max	Blank	Comments
1	Cell Type	C	1 char	-	-	no	C = CDMA (+ optional Analog) T = TDMA (+ optional Analog) G = GSM BSIC-defined sector (G & GC records cannot be mixed in one cell site file) GC = GSM Channel (BCCH)-defined sector (G & GC records cannot be mixed in one cell site file) I = iDen U = UMTS A = Analog (Hyperband must be 'c'). ¹
2	Sector ID	B	1-4 char	-	-	no	Cell Site Name is intended to be the same for all sectors in the same Cell. Sector ID field is intended to differentiate sectors on a cell.
3	Cell Site Name	N_FirstSt	1-20 char	-	-	no	CellSiteName and SectorID will be shown as follows in screen and log files: SectorID.CellSiteName
4	Latitude	37.3800	degrees	-90	90	no	Degrees.decimal format is required. Six digits to the right of the decimal point are preserved.
5	Longitude	-121.9409	degrees	-180	180	no	
6	sector Orientation	25	degrees	0	359	yes	0 degrees is north, 90 degrees is east, 180 degrees is south, 270 degrees is west.
7	sector Beam Width	120	degrees	1	360	yes	-

Cellsite File Format

8	Hyperband		c	1 char	-	-	no	c = Cellular / GSM850 (Hyperband must be 'c' for Analog Celltype) p = PCS-1900 g = GSM-900 d = DCS-1800 i = 800MHz iDEN band j = 900Mhz iDEN band u = UMTS band (2100Mhz)
9	Band		A	1 char	A	F	no	Must be A if hyperband is u, i, j, g or d. Must be A or B if hyperband is c.
10	Analog DCC ¹		2	decimal	0	3	yes	Optional for Cell Type=C or T. If Cell Type='A', this field is required. Hyperband must be c if DCC is specified. If SAT is specified then DCC must be specified as well.
11	Analog SAT ¹		1	decimal	0	2	yes	Optional for Cell Type=C or T If Cell Type='A', this field is required Hyperband must be c if SAT is specified. If DCC is specified then SAT must be specified as well.
12	Analog Channel Set # ¹		12	decimal	1	21	yes	If sector# is blank then only SAT/DCC are used for cellname look-up. Hyperband must be c.
13	Cell Identifier (Technology Specific)	Cell Type='C' CDMA PN	501	decimal	0	511	no	CDMA PN
		Cell Type='T' TDMA DVCC	196	decimal	0	255	no	TDMA DVCC
		Cell Type='G' GSM BSIC	25	octal	0	77	no	GSM BSIC (BSIC in OCTAL (0-77), not decimal (0-63))
		Cell Type="GC" GSM BCCH	150	decimal	0	1023	no	GSM Broadcast Control Channel -- BCCH (BCCH in decimal (0-1023))
		Cell Type='I' iDEN Carrier#	5EF	hexadecimal	001	5EF	no	iDEN Carrier Number
		Cell Type='U' UMTS Scrambling Code	501	decimal	0	511	no	UMTS Primary Scrambling Code (see 3GPP TS 25.213 section 5.2.2)
		Cell Type='A' Analog (blank)	(blank)	(blank)	(blank)	(blank)	yes	The only case where blank is valid for this field is for Cell Type = A (Analog). For an analog only cell site, Color Code(s) indicated in Analog DCC and Analog SAT and Analog Channel Set# fields.
14	iDEN BRR		123	decimal	000	999	yes	Base Radio information. This field is only supported for iDEN (Cell Type = I) -- it must be blank for other Cell Types. This is a 3 digit decimal number which is intended to be used to encode information related to the base radio associated with the iDEN carrier number. If the imported field is blank the value 000 will be reported/ exported.
15	iDEN Color Code		15	decimal	0	15	iDEN - no others - yes	iDEN Color Code This field is only supported for iDEN (Cell Type = I) -- it must be blank for other Cell Types. This field is required for iDEN (Cell Type = I).

NOTES:

1) Analog cellname look-up is not supported for RCU/ZK-SAM products. The analog specific fields may import and export but there is no reporting of cellname for Analog for RCU/ZK-SAM.

Cellsite File 4.x Format & Document History:

* 2007-03-05, removed some incorrect comments about display/logging of "SectorID.Cellname".
Cosmetic clean-up to formatting.

V4.2 -- 2007-04-23, (first supported by 9.2 firmware) NOTE: Now this version is now essentially obsolete. V4.2 iDEN cellsite files were only supported by the "iDEN phase 1" 9.2 firmware release. This version add iDEN support, including new iDEN only BRR field # 14. Also many refinement to document content and formatting.

V4.3 -- 2007-06-14 (first supported by 9.4 firmware) Added iDEN Color Code field -- required by the 9.4 firmware releases and newer for cellsite files containing iDEN entries. Renamed the field #13 from "Color Code" to "Cell Identifier" to avoid confusion between field #13 and #15.
* 2007-07-03, updated note to indicate new ZK-SAM firmware versions support 24,320 cell site file entries.

V4.4 -- 2007-11-20 (first supported by 9.6 firmware) Added UMTS support, including UMTS hyperband (2100Mhz downlink) support.

